BL3414-P Module

Features

- RISC 32bit MCU
  48KB SRAM
  512KB FLASH
- Operating Voltage：1.8V~3.6V
- RF Related Features
  - Frequency 2.400GHz~2.480GHz
  - Data Rate：1Mbps
  - Modulation Method：GFSK
  - Power：Max. +10dBm（Default 8±1.5dBm）
  - Receiving Sensitivity：-95±1.5dBm@1M
  - Supports Bluetooth 5.0
- Peripheral Device：
  - Up to 17/4 GPIOs depending on package option. All digital IOs can be used as GPIOS.
  - SPI
  - I2C
  - 1xUART
  - 6xPWM
  - 14 bit 6-Channel SAR ADC

- Operating Temperature：-20℃ to +85℃
- Half-Hole Surface Mount Package, supports SMT
- Module Dimensions：
  (13.3±0.2)mm *(21±0.2) mm *(3.2±10%)
  （with shielding cover）

Application

- Smart Transportation
- Smart Home/ Appliances
- Instruments/ Meters
- Healthcare
- Industrial Automation
- Smart Security
- Smart Energy

Module Model

BL3414-P

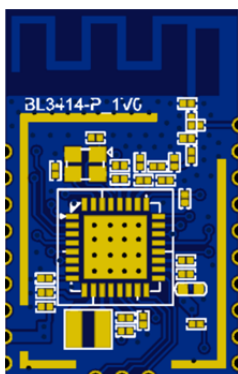| Module Model	Antenna Type	Description
BL3414-P	Bulit-In PCB antenna	

Table of Contents

1. Product Overview

BL3414-P is a BLE module launched by BroadLink, the SOC uses a 32-bit MCU, with 17 GPIOs exposed externally. All digital IOs can be configured based on GPIOS and adopts a stamp hole interface with 3.3V single power supply.

The module integrates radio transceiver, MAC, baseband, supports data transmission, able to self-network based on BLE. It can be widely used in applications like smart home devices, remote monitoring devices and medical care instruments.

2. Basic Specifications

2.1. Power Consumption

Please refer to Table 1 for consumption data.

Table 1   BL3414-P Power Consumption Data

Specifications	Min.	Typ.	Max.	Units
VDD	1.8	3.3	3.6	V
VIL(input low voltage)	VSS		0.3VSS	V
VIH(input high voltage)	0.7VDD		VDD	V
VOL(output low voltage)	VSS		0.1VDD	V
VOH(output high voltage)	0.9VDD		VDD	V
Io		10		mA
RX@1M*		5.3		mA
TX@0dBm with DCDC*		4.8		mA
Deep sleep with 16 KB SRAM retention		1.2		uA

*Experimental Data, approximate value；

2.2. Operating Environment

Please refer to Table 2 for Operating Environment data.

Table 2   BL3414-P Operating Environment Data

Symbol	Description	Min.	Max.	Units
Ts	Storage temperature	-40	85	℃
TA	Ambient operating temperature	-20	85	℃
Vdd	Supply voltage	1.8	3.6	V
Vio	Voltage on IO pin	0	3.3	V

3. Radio Specifications

3.1. Basic Radio Specifications

Please refer to Table 3 for radio specifications

Table 3   BL3414-P Radio Specifications

Name	Spec.	Min.	Default	Max.	Unit	Note
Normal RF Condition						
FOP	Frequency Range	2400		2500	MHz	
FXTAL	Crystal Oscillator Frequency		24M		MHz	
Specification		BLE 4.2				
Emission Characteristic Parameter						
PRF	RF Output Power	-45	7	10	dBm	Note(1)
BW	20dB Broadband		2.5		Mhz	
Reception Characteristic Parameter						
SEN	Receiver Sensitivity @PER 30.8% 1Mbps		-95		dBm	

FET	Frequency Offset Correction Range	-250		300	KHz	
Carrier Frequency Offset						
FOF	Centre Frequency Offset	-150		150	KHz	
FD	Frequency Drift	-50		50	KHz	
FDR	Max. Drift Rate	-20		20	KHz	
Modulation Characteristics						
Delta F1 Avg		225		275	KHz	
Delta F2 Max @99.9%			≥185		KHz	
Delta F2 Avg/Delta F1 Avg			≥0.8			

（1） The output power is determined by the output level configured in the corresponding registers within the software.

4. BL3414-P Hardware Information

4.1. PIN Definition

Please refer to Table 4 for PIN definitions.

Table 4   BL3414-P PIN Definitions

PIN	Function 1	Function 2	Function 3
1	PD7	UART_TX	All functions *
2	PA0	UART_RX	All functions *
3	PD4		
4	PA1		
5	PD2	PWM1	All functions*
6	PB1	PWM0	All functions*
7	PB4	PWM2	All functions*
8	VDD		
9	GND		
10	REST		
11	PC2	PWM3	All functions*
12	PC3	PWM4	All functions*
13	PC4	PWM5	All functions*

14	PC0		
15	PC1		
16	PA7	SWS	
17	PD3	UART_LOG	All functions*
18	**GND**		
19	PB5		All functions*
20	PB6		All functions*
21	PB7		All functions*
22	RF_OUT		

PS:

1. All functions* include the ability to define function configurations based on the table: SPI_CN_IO, SPI_CK_IO, SPI_MOSI_IO, SPI_MISO_IO, SWM_IO, ANT_SEL2, ANT_SEL1, ANT_SEL0, I2C_SDA_IO, I2C_SCL_IO, UART_RX_I, UART_TX, UART_RTS, UART_CTS_I, PWM5_N, PWM4_N, PWM3_N, PWM2_N, PWM1_N, PWM0_N, PWM5, PWM4, PWM3, PWM1, PWM0;

2. PA7 defaults to SWS as programming PIN (3.3V/GND/SWS interface，programmed using a designated programmer）；

3. PD3 is set by default as a GPIO-simulated UART_LOG debugging port，for easy log viewing;

4.2. Mechanical Dimensions

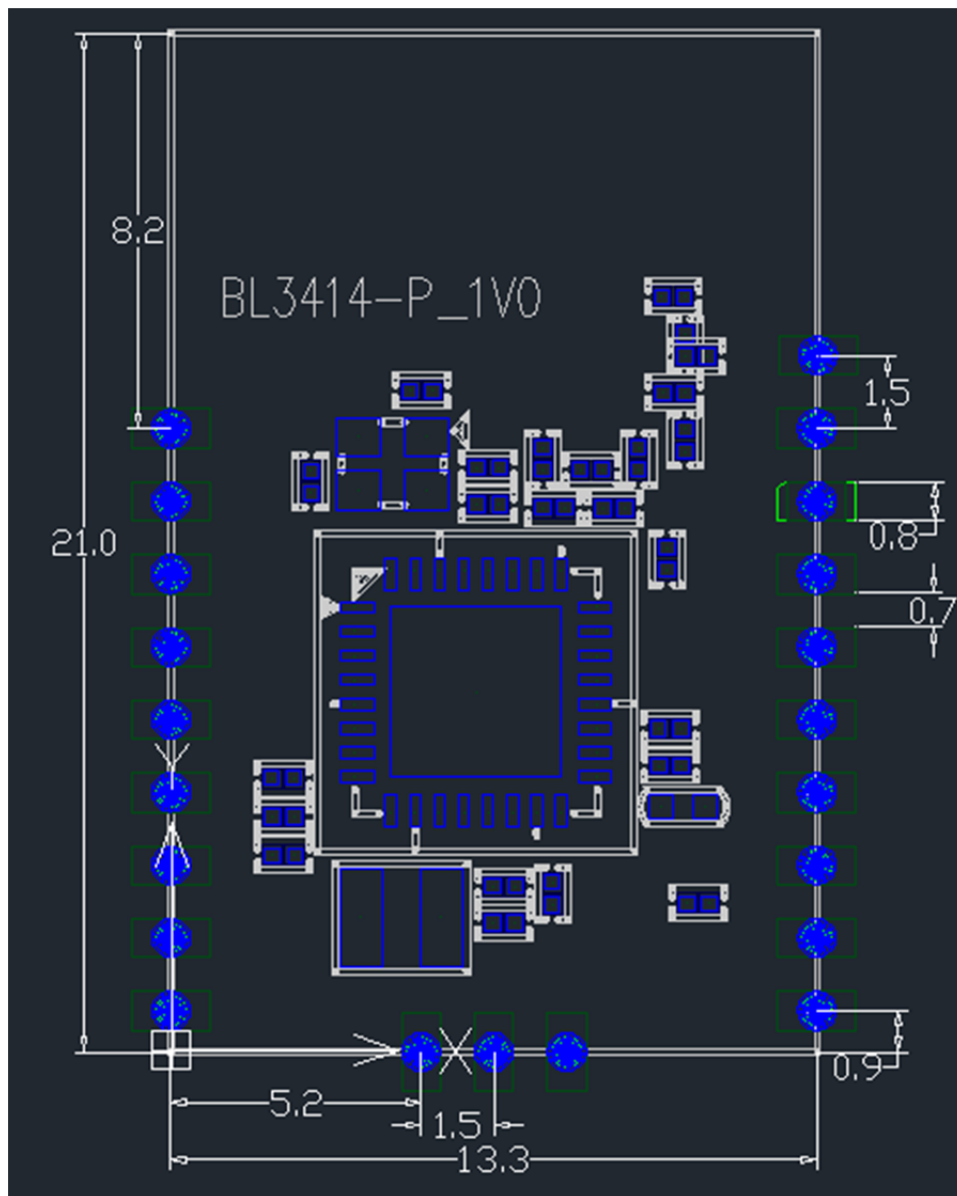Please refer to Fig. 2 for the dimensions of module. Unit: mm.

Fig 2　BL3414-P Module Dimensions

Note: Dimensions(13.3±0.2) mm * (21±0.2) mm*(3.2)MAX. mm

（with shielding cover）
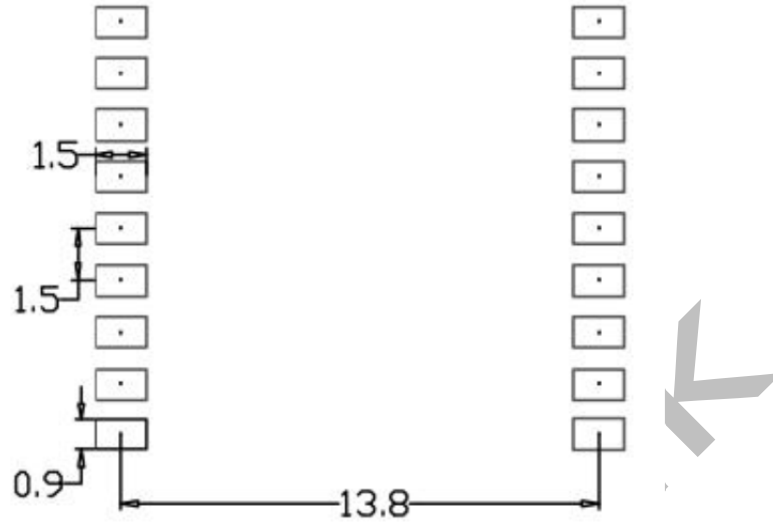
4.3 Recommended Solder Pad

Fig 3   Module recommended solder pad size

4.4. Usage Instructions

1. There should be no metal components, or traces within 30mm around the onboard antenna and the bottom area should be kept clear as much as possible. Avoid routing high-speed clock lines, high-current power lines, etc.

2. The 3.3VD power PIN requires 10uF-47uF capacitors in parallel with several 18pF to 100nF capacitors.

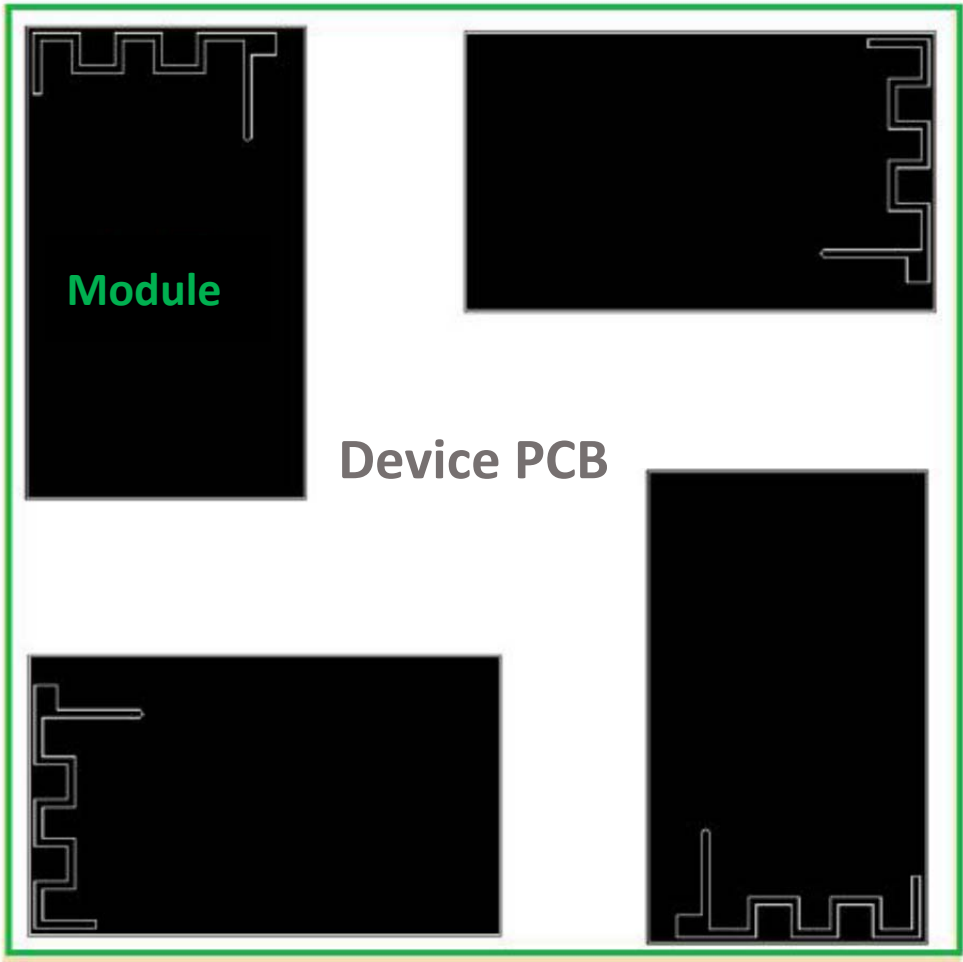3. The preferred position for the module is shown in Fig 4.

Fig 4   Optimal Position of Module

Version Update

Date	Version	Update Notes
2024-4-18	1.0	Initial document
2024-6-11	1.1	Update module IO PIN

Copyright

Use or reproduction of all or any part of this manual, including its contents, without permission is prohibited. This applies in particular to trademarks, model names, part numbers and graphics.

Contact Us

Ms Zhou
Hangzhou BroadLink Technology Co., Ltd.
Address: Building C, 57 Jiang'er Road, Binjiang District, Hangzhou, P.R.China
Postcode: 310052
Tel: +86-571-85071744-8010
Email: bingqi.zhou@broadlink.com.cn

For more information of BroadLink Wi-Fi modules, please visit our website: www.broadlink.com.cn

List of applicable FCC rules

FCC Part 15.247

Label and compliance information

FCC ID label on the final system must be labeled with "Contains FCC ID: 2ATEV-BL3414-P" or "Contains transmitter module FCC ID: 2ATEV-BL3414-P".

Information on test modes and additional testing requirements

Contact Hangzhou BroadLink Technology Co., Ltd will provide stand-alone modular transmitter test mode. Additional testing and certification may be necessary when multiple modules are used in a host.

Additional testing, Part 15 Subpart B disclaimer

To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Supplier's Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that the after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements. Since this may depend on the details of how the module is integrated with the host, Hangzhou BroadLink Technology Co., Ltd. shall provide guidance to the host manufacturer for compliance with the Part 15B requirements.

FCC Warning

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE 1: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance.

Note 1: This module certified that complies with RF exposure requirement under

mobile or fixed condition, this module is to be installed only in mobile or fixed applications.

A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

A fixed device is defined as a device is physically secured at one location and is not able to be easily moved to another location.

Note 2: Any modifications made to the module will void the Grant of Certification, this module is limited to OEM installation only and must not be sold to end-users, end-user has no manual instructions to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products.

Note 3: The module may be operated only with the antenna with which it is authorized. Any antenna that is of the same type and of equal or less directional gain as an antenna that is authorized with the intentional radiator may be marketed with, and used with, that intentional radiator.

Note 4: For all products market in US, OEM has to limit the operation channels in CH1 to CH11 for 2.4G band by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change.

IC WARNING
This device contains licence-exempt transmitter(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
(1) This device may not cause interference.
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage;

2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IC Radiation Exposure Statement:

This device and its antenna(s) must not be co-located with any other transmitters except in accordance with IC multi-transmitter product procedures. Referring to the multi-transmitter policy, multiple-transmitter(s) and module(s) can be operated simultaneously without reassessment permissive change.

Cet appareil et son antenne (s) ne doit pas être co-localisés ou fonctionnement en association avec une autre antenne ou transmetteur.

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20cm de distance entre la source de rayonnement et votre corps.

This module is limited to OEM installation only and must not be sold to end-users, end-user has no manual instructions to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products. Additional testing and certification may be necessary when multiple modules are used.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

The final end product must be labeled in a visible area with the following " Contains IC: 25062-BL3414P ".